

REMARKS

Claims 1-8, 11-14, and 16-20 remain in the present application. Claims 1-3, 5, 8, 11, 13-14, and 16-20 are currently amended. Claims 9-10 and 15 have been canceled without prejudice. No new matter has been added.

Claim Rejections - 35 USC §103

Claims 1-8

Claims 1-8 are rejected under 35 USC §103(a) as allegedly being unpatentable over Zejda (U.S. Pat. 5,228,968, hereinafter “Zejda”) in view of Maeda et al (U.S. Pat. 5,620,523, hereinafter “Maeda”) and further yet in view of Ando et al (U.S. Pat. 6,458,253, hereinafter “Ando”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 1-8 are not rendered obvious by Zejda in view of Maeda and further yet in view of Ando for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 1 that recites an apparatus comprising:

- a chamber defining an interior space;
- a component for generating a plasma in said interior space of said chamber;
- a mounting component adapted for positioning at least one substrate/workpiece in said interior space of said chamber for receiving treatment in said plasma;
- a gas supply component for injecting at least one gas into said interior space of said chamber; and
- a component for applying a bias potential to said gas supply component for suppressing plasma formation at gas outlet elements, wherein said component for applying a bias potential is electrically isolated from said component for generating said plasma.

Claims 2-8 depend from independent Claim 1 and recite further elements of the claimed embodiments.

Page 6 of the rejection states:

Ando et al. teach means (81) for applying a bias potential to the gas supply for suppressing plasma formation at the at least one outlet orifice, wherein the component for applying the bias potential (81) is electrically isolated form the component (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67)

Applicants respectfully submit that Ando fails to teach or suggest the elements “a component for applying a bias potential to said gas supply component for suppressing plasma formation at gas outlet elements, wherein said component for applying a bias potential is electrically isolated from said component for generating said plasma,” as recited in Claim 1.

Applicants respectfully submit that Ando teaches:

The potential of the anode 41 is controllable by a dc power supply 81 for the anode. A voltage resulting from superposition of a dc bias and high frequency or rectangular waves of 1 kHz to 500 kHz can be applied from a sputter power supply 82 to the cathode 12, so that the power induces a discharge in the discharge space 18 on the surface of the target 13, thus sputtering the target 13. (Column 12, Lines 59-65)

The gas introducing part of the anode 41 is as described above and is preferably a member having many holes for permitting the gas to be uniformly introduced onto the sputtered surface of the target 13 of the hollow shape, or a porous member made of the same material as the target 13. Here, the flow rate, purity, and pressure of the introduced gas are accurately controlled. (Column 13, Lines 51-57)

The target voltage is strongly dependent on the surface condition of the target 13. For realizing high-speed sputtering in the present embodiment, the surface condition of the target needs to be kept in the metal state. For this reason, it is necessary to make the partial pressures of the reactive gases near the surface of the target 13 as low as possible.

Therefore, in the present embodiment, the target bias voltage is regulated, particularly, by controlling with the control unit 160 the supply flow rates of F₂ or H₂O supplied from the first reactive gas supply system 32 between the substrate 70 and the target 13 such that their partial pressures decrease with the lapse of time. (Column 15, Lines 55-67)

As described above, the control of the voltage of the anode 41 by the control unit 160 can control the plasma density in the vicinity of the substrate 70 to increase the concentration of reactive, active species depending on the kind of the formed film, thereby enhancing the reactivity, or to increase the incident energy and density of Ar ions to the substrate 70 during film formation to improve the denseness and adhesion of the film. (Column 17, Lines 21-28)

Therefore, Applicants understand Ando to teach controlling the potential of a gas introducing anode in order to induce discharge on the surface of the target, thus sputtering the target. The voltage is controlled in order to keep the surface condition of the target in the metal state. Thus, a control unit controls the voltage of the anode in order to enhance reactivity and improve the denseness and adhesion of the film. As such, Ando fails to teach or suggest “a component for applying a bias potential to said gas supply component for suppressing plasma formation at gas

outlet elements, wherein said component for applying a bias potential is electrically isolated from said component for generating said plasma,” as recited in Claim 1.

Applicants respectfully submit that Maeda and Ando, either alone or in combination with Ando, also fails to teach or suggest the elements of “a component for applying a bias potential to said gas supply component for suppressing plasma formation at gas outlet elements, wherein said component for applying a bias potential is electrically isolated from said component for generating said plasma,” as recited in Claim 1. For these reasons, Applicants respectfully submit that independent Claim 1 is not rendered obvious by Zejda in view of Maeda and further yet in view of Ando, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 2-8 recite further limitations claimed in independent Claim 1, Applicants respectfully submit that Claims 2-8 is also not rendered obvious by Zejda in view of Maeda and further yet in view of Ando. Therefore, Applicants respectfully submit that Claims 1-8 are allowable.

Claims 11-14, 16, and 18-20

Claims 11-14, 16, and 18-20 are rejected under 35 USC §103(a) as allegedly being unpatentable over Zejda in view of Maeda and further yet in view of Ando. For the reasons discussed above, Applicants respectfully submit that Claims 11-14, 16, and 18-20 are not rendered obvious by Zejda in view of Maeda and further yet in view of Ando, thereby overcoming the 35 USC §103(a) rejection of record. Therefore, Applicants respectfully submit that Claims 11-14, 16, and 18-20 are allowable.

Claims 17

Claim 17 is rejected under 35 USC §103(a) as allegedly being unpatentable over Zejda in view of Maeda and further yet in view of Ando and still further yet in view of Suzuki et al. (US 6,627,253, hereinafter “Suzuki”). For the reasons discussed above, Applicants respectfully submit that independent Claim 11 is not rendered obvious by Zejda in view of Maeda and further yet in view of Ando and still further yet in view of Suzuki. Since Claim 17 recites further elements to those claimed in independent Claim 11, Applicants respectfully submit that Claim 17 is also not rendered obvious by Zejda in view of Maeda and further yet in view of Ando and still

further yet in view of Suzuki, thereby overcoming the 35 USC §103(a) rejection of record. Therefore, Applicants respectfully submit that Claim 17 is allowable.

Conclusion

In view of the above, it is submitted that the Claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of Claims 1-8, 11-14, and 16-20 at an early date is solicited.

The Examiner is invited to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-4160 and please credit any excess fees to such deposit account.

Respectfully submitted,

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